Software Manual

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VETA Receiver Series

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Revision History

Version	Date	Main Changes from Previous version	Edited by
X1	9-17-2009	Initial Release	RM
X1A	1-12-2010	Cobham branding	DRF

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1. Acronyms

This section lists and describes the various acronyms used in this document.

Name	Meaning
16QAM	16-state Quadrature Amplitude Modulation
A/V	Audio/Video
AES	Advanced Encryption System
ABS	Basic Encryption System (8 bit)
C-OFDM	Coded Orthogonal Frequency Division Multiplexing
CSM	Compact Surveillance Modem
CVBS	Composite Video
BDC	Block-Down Converter
FEC	Forward Error Correction
GUI	Graphical User Interface
I/O	Input/ Output
KBaud	Kilobaud per second
Kbps	Kilobits per second
Mbps	Megabits per second
MER	Modulation Error Rate
MPEG	Moving Picture Experts Group
NTSC	National Television System Committee
PAL	Phase Alternation Line
QPSK	Quadrature Phase Shift Keying
QAM	Quadrature Amplitude Modulation
RF	Radio Frequency
RX	Receiver
S/N	Signal-to-Noise Ratio
THD	Total Harmonic Distortion
TX	Transmitter
VDC	Volts (Direct Current)

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VDL	VETA Digital Link
VR	VETA Receiver
VT	VETA Transmitter
VDR	VETA Digital Repeater
VMT	VETA Messenger Transmitter
VNA	VETA Network Adapter
UDP	User Datagram Protocol

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2. Software Control Overview

This Software is used for all GMS products based on VETA Receivers, including VR, VMR, MVRD and MVMR. However each product uses specific control cable. Control cables, as well as connector pin outs, are described in details in corresponding product manual.

Configuration, control and monitoring of the VETA Series Receivers are enabled through the use of GMS' optional (sold separately) MS Windows-based VETA RX Configurator software program (GMS Part Number 630-SW0093*). This Graphical User Interface (GUI) program provides the end user with a straightforward way to interface with the VETA Receiver units (including VR, VMR, VDR RX, etc). During normal operation, once a VDL link is established, the VETA RX Configurator GUI can be used to monitor the link statistics as well as control the receiver. Monitoring the link statistics is an optional operation therefore, if desired, the VETA RX Configurator GUI does not need to be active and can be disconnected from the VETA RX unit after the link is established.

2.1 System Requirements

The VETA RX Configurator program has been developed and tested on Windows 2000, Windows XP and Windows NT. Although the VETA RX Configurator program may work properly on other operating systems, no GMS support or assistance can be provided concerning other operating systems.

2.2 Software Installation

The following instructions outline the installation process for the VETA RX Configurator program:

- Insert provided CD-ROM into computer.

- Click on 'setup.exe' file. This will launch the GMS_VR Setup program and several initial setup files will begin to be copied onto the computer.

- After the initial setup files are copied over, the GMS_VR Setup program will prompt the user to close any applications that are running. Once all other programs are exited, click on the 'OK' button.

- The GMS_VR Setup program will prompt the user to click on the 'computer icon' button to begin installation. If desired, the user can change the destination directory from the default. Click on the 'computer icon' button.

- The GMS_VR Setup program will then prompt the user to 'Choose Program Group'. If desired, the user can change the program group from the default. Click on the 'Continue' button.

- After installing the VETA RX Configurator program, the GMS_VR Setup program will put up a window indicating that setup was completed successfully. Click 'OK'.

2.3 Product Control & Status Monitoring Approach

GMS Transmitters and Receivers provide programmable presets or configurations that can be set up through special programming software by Administrators. Configurations are selected by the user though M.S. Windows Application programs. The VETA products allow 16 configurations.

Administrators define the configurations for specific applications. Each configuration completely defines all of the Unit parameters including center frequency, modulation parameters, Video, Audio, User data and encryption. Field personnel will select specific configuration via pre-determined guidance from the Administrators. Matching the Transmitter operation to the Receiver operation is as simple as selecting the same configuration for both. For example: If the Transmitter is set to configuration #3, then the Receiver needs to be set to configuration #3 for them to operate together.

2.4 VETA RX Configurator Functions

The VETA RX Configurator program provides the user access to many different configuration, control and monitoring options. When the VETA RX Configurator program is launched, the screen shown in Figure 1 is displayed. The user should first select the serial port their computer is connected to via the Serial Port Selector and Status region. If the selected serial port is valid, the gray-colored status box will show 'Ready'. The Device Selector region allows the end user to choose to interface to a VETA RX (receiver) unit. To configure a VETA RX, select the 'VR' box in the Device Selector region. Once the 'VR' box is selected, the screen shown in Figure 2 is displayed. The VETA RX Configurator program contains function buttons and all the configurable settings available on a VETA Receiver Units. The following sections explain, in detail, the various options.
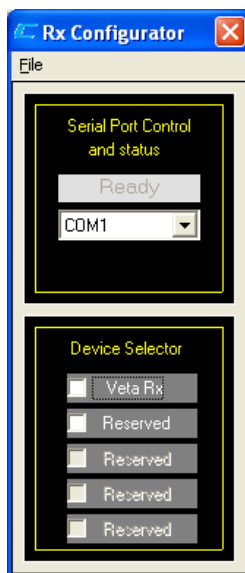
Figure 1 – VETA RX Configurator
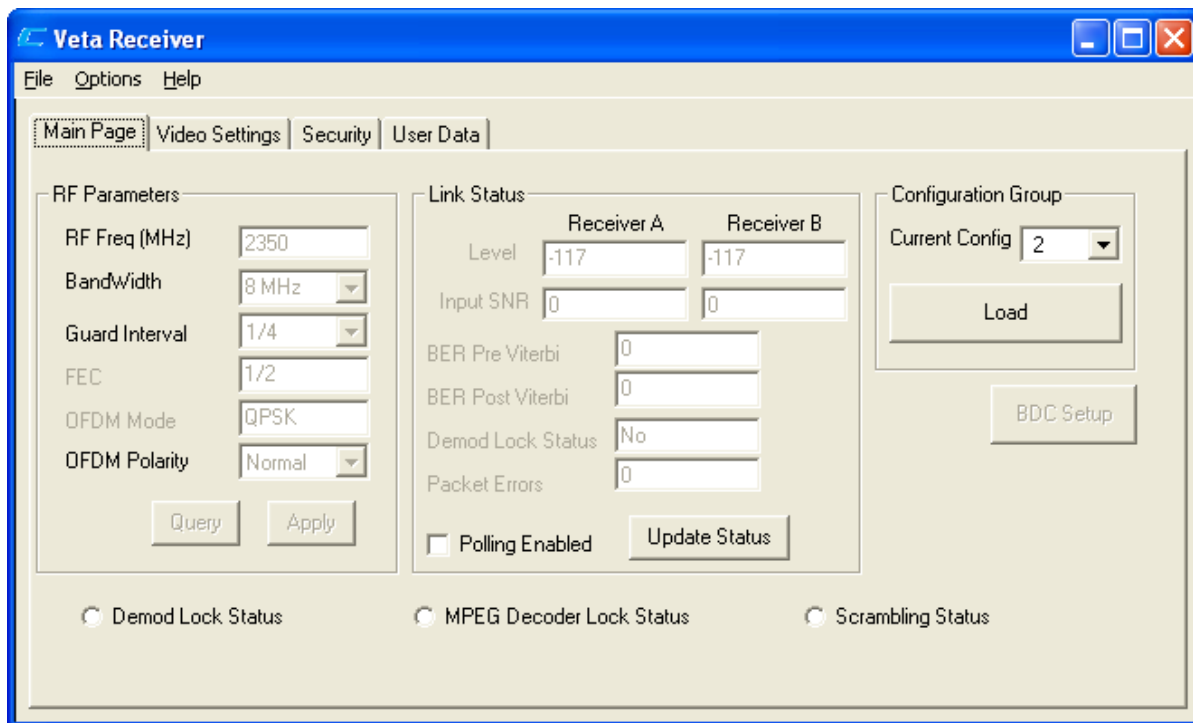
Figure 2 – VETA RX GUI Main Screen

2.5 Access levels

As was mentioned previously, VETA Control Software has 2 levels of access – User and Administrator. To have full access to the controls, it is necessary to enter password provided by GMS into the Administrator Login window, which is located under *Options* pull-down menu. The password can only be changed by the factory.

User Level Access only allows changing the predefined configuration groups.

2.6 Main Page Tab

The VETA Receiver Control Software consist of four tab indexes: *Main Page, Video Settings, Security* and *User Data* tabs (see Figure 2). It also has three pull-down menus consisting of the *FILE*, *OPTIONS* and *HELP*. Under the menus are pull down submenus and selections which are explained in detail later in this document.

The *Main Page* tab consist of the *RF Parameters* group, the *Link Status* group, the *Configuration* Group and a shortcut button to the *BDC (block down converter) Setup* parameters.

2.6.1   The RF Parameters Group

This group consists of the following fields as shown Table 1 below along with explanation of each. Keep in mind the column labeled "*R/W*". Any field marked "*R*" indicates this is a "read' only (a status indicator), it cannot be changed by the user. Any field marked "*R/W*" or *Read/Write,* indicates the value can be changed by the user.

After changing any "R/W" field with a new value the user must click on the *APPLY* button for the change to take effect. Clicking on the *CANCEL* button (or *Query* button) will cancel the operation (previous values are restored).

Field	R/W	Description
RF Freq (MHz)	R/W	RF input frequency at BDC (block down converter) input. The receive frequency can be changed by entering the new desired frequency in this field.
Bandwidth	R/W	This field displays the bandwidth of the received OFDM signal. It should be set to the same bandwidth of the transmitter selected from the following values: *6, 7 or 8 MHz* or with optional narrow bands 1.25 or 2.5 MHz
Guard Interval	R/W	User selects the guard interval which matches the transmitter. Guard interval sizes are selected from the following values *1/32, 1/16, 1/8 or ¼. When in narrow band (1.25 or 2.5 MHz) guard intervals are limited to either 1/16 or 1/8.*
FEC	R	This field displays the COFDM FEC (forward error correction) that is being demodulated at the receiver. FEC values are 1/2, 2/3, 3/4, 5/6. When in narrow band (1.25 or 2.5 MHz) FEC values are limited to 1/3 or 2/3.
OFDM Mode	R	This field displays the COFDM constellation (QPSK, 16 QAM) that is being demodulated at the receiver.
OFDM Polarity	R/W	This field displays whether OFDM signal is set to Normal or Inverted Spectrum.

Table 1 – RF Field Definitions

2.6.2   Link Status Group

This group consists of read only fields (status indicators) along with a "Polling Enabled" checkbox and an "Update Status" button. The indicators are for both receiver A and receiver B (diversity inputs). The fields are shown in Table 2 below with a description.

Field	R/W	Description
Level	R	This field indicates the received signal level. Normal levels are around -15 to -90 dBm. Keep in mind signals greater than -15 dBm will overload the front end (BDC-s) and cause poor performance and signals less than -90 dBm may be too weak. The gain settings of the BDC-s will affect these readings
SNR	R	Input Signal-to-Noise Ratio. This read-only field conveys the SNR of the received signal as measured by the demodulator. *Value expressed in dB.* In QPSK: values greater than 13dB represent strong RF signals. In 16-QAM; values greater than 18dB represent strong RF signals

Field	R/W	Description
BER Pre Viterbi	R	This read-only field conveys the BER (Bit Error Rate) of the received signal after Read-Solomon (Outer Code) Forward Error Correction (FEC) processing and before Viterbi (Inner Code) FEC processing in the receiver chain. *Value expressed in 10^{-6}*.
BER Post Viterbi	R	This read-only field conveys the BER (Bit Error Rate) of the received signal after performing all error correction techniques in the receiver chain. *Value expressed in 10^{-6}*. Any numbers greater than 0 in this field indicate the presence of un-correctable errors in the received stream and may result in packet errors.
Demod Lock Status	R	This read-only field indicates that the demodulator is locked onto incoming RF input signal. Values are locked or not locked.
Packet Errors	R	Indication of the number of packet errors in the TS. Excessive packet errors will cause picture glitches and artifacts

Table 2 − Link Status Field Definitions

The above fields are only updated once when the control software is first initialized. They are not updated further unless the *Polling Enabled* check box is checked, in which case polling is turned ON continuously.

Under the "Options" menu there is a menu called "Polling Options". In this window the user can set the polling interval (in ms)

Note: When making changes to Receiver OFDM parameters, polling should be disabled to prevent GUI interfering with User changes.

If the Polling Enabled check box is not checked, an **Update Status** button appears; by pressing this button the link status parameters are updated (refreshed) each time the button is pressed.

2.6.3   Configuration Group

The Configuration Group consists of a pull down box in which one of eight configurations can be selected along with a *LOAD* button.

The VETA Receiver can store (in memory) 8 configurations. These are pre-configured before leaving the factory but can be changed by the user. These 8 configurations are also set to match the transmitter before leaving the factory.

☞ **Warning: If a configuration group is changed, it may not match the transmitter configuration group and the digital link may no longer work. Keep in mind the receiver and transmitter configuration groups settings must match.**

What you should know about configuration groups:

- Any field which is an R/W (read/write) can be and is stored in a configuration group.

- A group is selected by choosing one of the 16 groups and then clicking on the *LOAD* button. This action loads all R/W fields (under any of the TABs or pull down menus, not just the *MAIN PAGE TAB*) with the stored values of that group.

- A group can be changed by editing an R/W field and then clicking on the *APPLY* button ("*APPLY*" also automatically saves). All R/W field values (under any of the TABS or pull down menus, not just the *MAIN PAGE TAB*) are stored to the current configuration group (the current selected group).

For example, current group 1 is selected and the existing *RF FREQ* is set at 2300 MHz. User wants to change it to 2250 MHz. User changes *RF FREQ* field to 2250 and then clicks on the *APPLY* button. New frequency is automatically saved to the current group 1.

2.6.4 Status Indicators

The Demod lock status indicates if the demodulators are successfully locked to the ***RF signal***.

The MPEG Decoder Lock Status is an indication that the *Video Decoder* is successfully locked to the incoming digital bit stream.

Both indicators must be locked to decode the transport stream to display video. These indicators can be very helpful in troubleshooting. For example let's say the demod lock status is locked and the OSD (on screen display) is reporting good SNR readings; however the MPEG Decoder lock status is not locked. This could be an indication that video at the transmitter end has problems (of course it could indicate other errors as well).

Scrambling Status indicates that incoming signal is scrambled.

2.6.5 BDC Set Up Button

This button on the main page tab is basically a shortcut to the BDC (block down converters) setup page. It also can be found under the pull down Options Menu\System Setup\BDC. See Table 3 for an explanation the fields.

Keep in mind you must click on the *APPLY* button in order for new values to take effect.

☞ **Warning: These values are pre-set at the factory for each configuration group. If the values are changed they can prevent the digital link from working. Ensure they are correct before changing.**
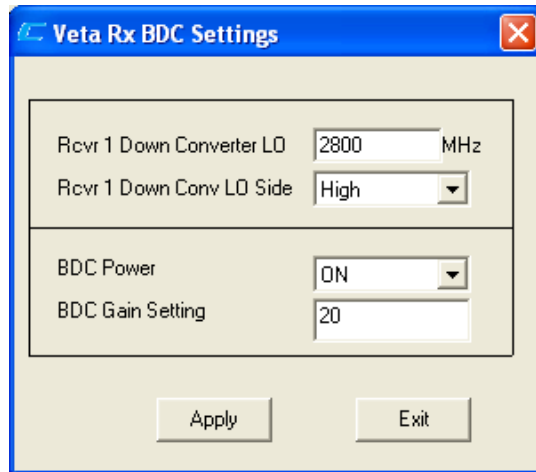
Figure 3 − BDC Settings Window

Field	R/W	Description
LO (MHz)	R/W	This field allows definition of the local oscillator *FREQUENCY* of the BDCs (block down converters).
Down Converter LO side	R/W	This field allows definition of the local oscillator side. Values are either *HIGH* or *LOW* side injection. High side injection means the LO is at a higher frequency than the RF. So if 'RF freq' – 'LO freq' = IF freq, then the IF Freq will be negative or the spectrum will be inverted. The opposite is true for LOW side injection. Selection of these values depends on the BDC-s used. They will vary depending on manufacturer.
BDC Power	R/W	This field determines if DC power is supplied to the BDCs via the IF Cable. Values are *On* or *OFF*. Caution: Make sure that the IF cable is not shorted prior to enabling DC power.
BDC Gain Setting	R/W	This field allows different gain values to be entered for the BDCs. *It does not affect the gain of the system.* It only allows for a more accurate reading of the received signal strength.

Table 3 − BDC Field Definitions

2.6.6   Video Settings Tab

This tab allows for various video parameters (see Figure 4) to be selected. It consists of *Video Selections* and *Video Status* sections. The fields are explained in Table 4 and **Error! Reference source not found.**. Once again you must click on the *APPLY* button after new values have been selected in order for them to take effect.
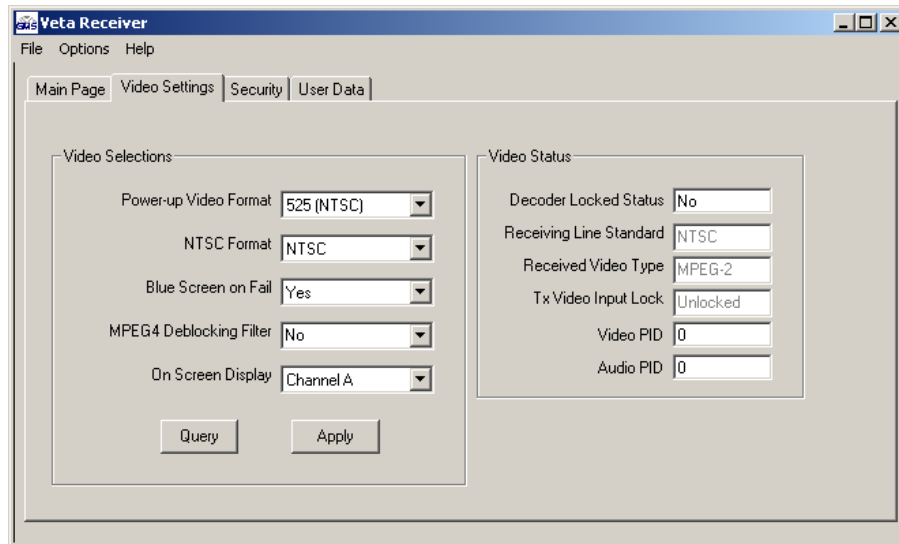
Figure 4 – Video Settings Tab

Field	R/W	Description
Power-up Video Format	R/W	This field allows user to select between *PAL, NTSC* or *NTSC with a 7.5IRE* pedestal. <u>*NOTE:*</u> *The VMR will automatically switch to the video format that it is locked onto (PAL or NTSC).*
NTSC Format	R/W	This field has two choices NTSC and NTSC with pedestal
Blue Screen On No Video	R/W	This field allows the user to select between a blue field video output (a *YES* value) or a freeze frame (a *NO* value) when no video is present.
MPEG 4 deblocking filter	R/W	This field allows user to turn the filter *ON* or *OFF*. The receiver must have the 1.25 MHz BW option for this setting. (Only used in Narrow Band modes)
On Screen Display	R/W	The OSD can be turned *OFF*, monitor channel *A* or monitor channel *B.* Polling functions may interfere with the OSD display.

Table 4– Video Selection Field Definitions

Field	R/W	Description
Decoder Locked Status	R	This is a read-only indicator is letting the user know if video decoder is *locked* to the incoming video. This indicator is also contained on the main page tab.
Receiving Line Standard	R	This read –only indicator shows the Video Standard of received signal.
Received Video Type	R	Shows the standard of the incoming TS (MPEG-2 or MPEG-4)

Field	R/W	Description
TX Video Input Lock	R	Shows if incoming signal is locked on Video
Video PID	R	Shows the Video PID of TS
Audio PID	R	Shows the Audio PID of TS

Table 5 – Video Status

2.6.7 Security Tab

This tab allows administrator to enable or disable encryption, to choose type of encryption to be used and enter the encryption key; ABS (supplied with link) and optional AES or B-crypt. AES and B-crypt have 4 sub selections: 128, 128+, 256 and 256+. 128 requires 32 hex symbols for the Key, while type 256 is more secure and requires 64 hex symbols. If the Receiver in simple 128 or 256 modes, then the incoming signal can be decoded if the keys are matched or the incoming signal is not encrypted. While the + modes allow decoding of incoming signal only if it is encrypted and the security keys in the TX and RX match.

If encryption is turned Off, then the Security Key window is displayed as shown in Figure 5.

Descrambling Mode pull-down list has all encryption modes, however if the unit doesn't have corresponding license it will return value that is licensed in the unit.

Security key field is different for different encryption modes. The modes that require 64 character key (AES, AES+, B-crypt, B-crypt+) have to two boxes for lower and upper parts of the key. See Figure 6.

User must enter the correct key, which must match the key of the transmitter. Clicking on the OK button will notify user if incorrect number of characters have been entered and user will not be able to exit this window unless the CANCEL button is clicked on or the right amount of characters are entered.
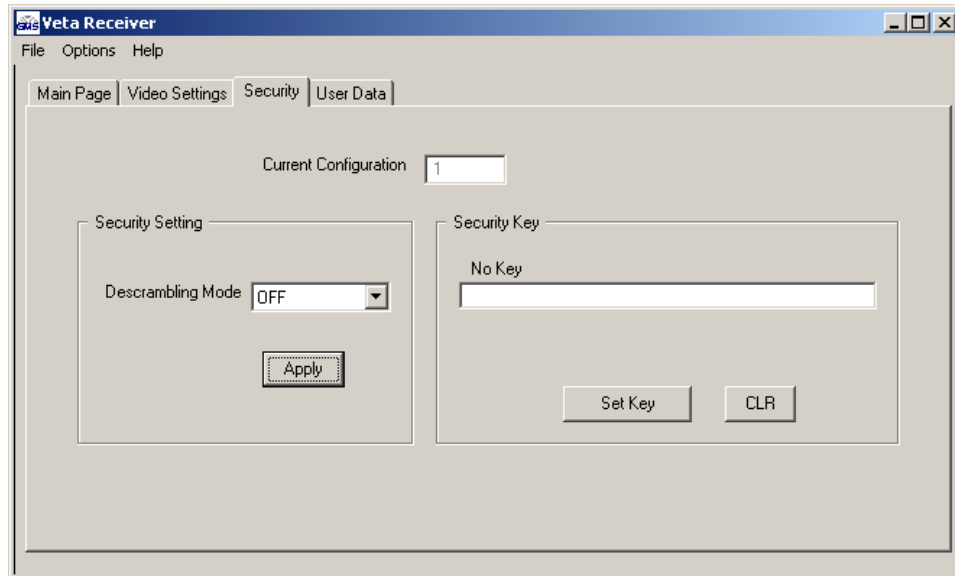
Figure 5 – Security Tab
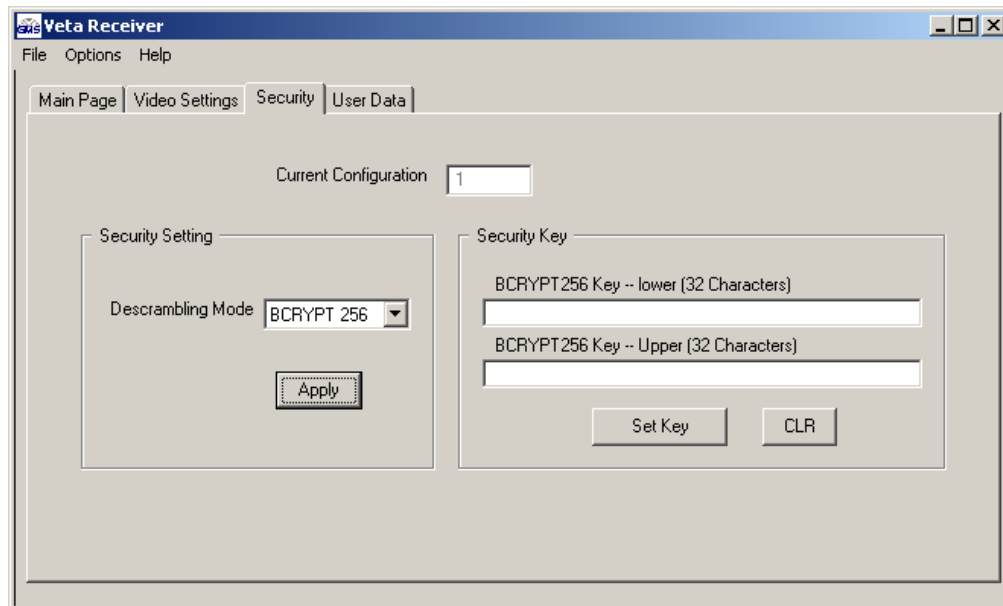
Figure 6 – Security Tab in B-crypt Mode

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Field	R/W	Description
Encryption	R/W	This field allows user to select between OFF, ABS, AES 128, AES 128+, AES 256 or AES 256+. (AES 128 and 256 are optional).
Key	R/W	This field allows user to enter the proper number of characters for the encryption key.

Table 6 – Encryption Field Definitions

2.6.8   User Data Tab

This tab (see Figure 7) allows user to turn USER DATA ON or OFF. If turned ON, the receiver extracts any User Data component that may be in the transmitted stream. The data is presented on the DATA output port of the receiver on pins 8 & 9 of the J2 connector (see corresponding manual 100-M0087*).

The DATA BAUD RATE field is a read only and basically just reports the transmitted RS232 data baud rate.
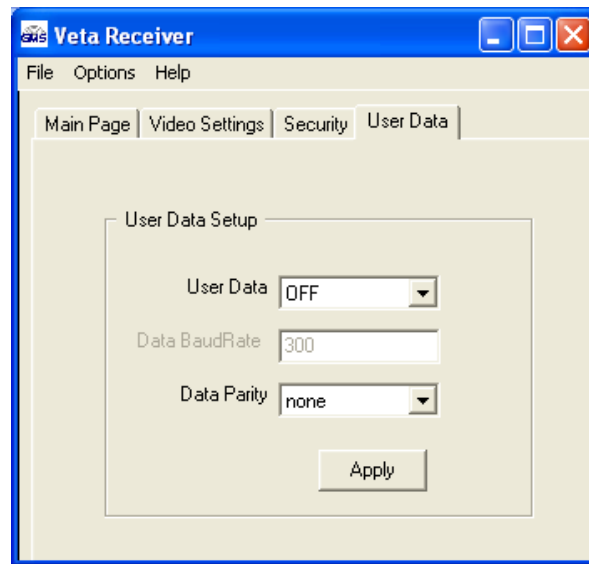
Figure 7 – User Data Tab

Field	R/W	Description
User Data	R/W	This field allows user to select between *ON & OFF* values. When the control is set to ON, the user can extract RS232 data from the data output port (J2 pins 8 & 9) of the receiver.
Data Baud Rate	R	This is a read only field that reports the baud rate of the RS232 data component that is present in the transport stream.
Data Parity	R/W	User can choose from *None, Even or Odd*.
Data PID	R/W	Shows the Data PID of TS

Table 7 – User Data Field Definitions

3. Pull-Down Menu Definitions

This section discusses the Pull-Down Menus that include FILE, OPTIONS and HELP.

3.1 File

This menu contains only one selection - *EXIT*. The *EXIT* selection closes and exits the PC control software. Alternatively, the *X* box in the upper right hand corner of the window can be used to exit the program.

3.2 Options

The number of selections in this menu depends on login level.

For user level, this menu contains four selections:

- Special Setup
- BDC Settings
- Polling Options
- Administrator login

Administrator login (see Figure 8) adds the following selections:

- Load Configuration File
- Write License Code
- Write License File
- Restore Default Configuration
- Log Off

Figure 8 − Options

3.2.1 Special Setup

Special Setup is configured at the factory for specific application and for advanced operations only. Consult GMS before changing any of these parameters.

This selection brings up a window with special parameters (see Figure 9). Selections are described in Table 8.
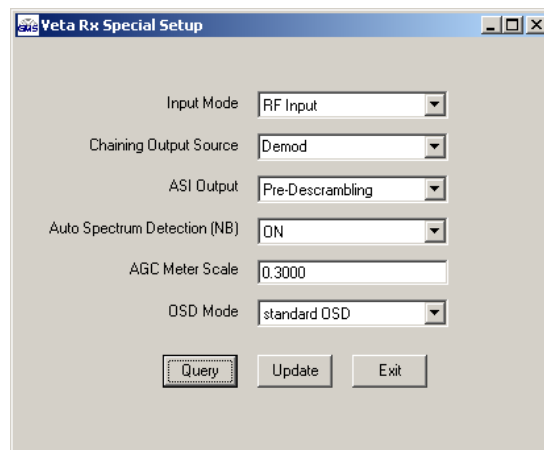
Figure 9 − Special Setup

Field	R/W	Description
Input Mode	R/W	This field allows the user select between RF input and Chaining Input.
Chaining Output Source	R/W	The selections are Demod and Chaining In, determines the source for chaining output.
ASI Output	R/W	Allows to select ASI Output before or after Descrambling
Auto Spectrum Detection	R/W	When On the receiver automatically detects Spectrum Polarity. This selection is valid for Narrowband only.
AGC Meter Scale	R/W	The range for this AGC scale is 0 − 10. Decimal point is allowed.

Field	R/W	Description
OSD Mode	R/W	The selections are Standard OSD (see Figure 10), Alarm OSD Banner (displayed only when receiver is not decoding), Others (Advanced OSD).

Table 8 – Special Setup Parameters

Figure 10 – Standard OSD

3.2.2   BDC Settings

Clicking on this selection opens up the BDC Settings window. This window was previously discussed in section 2.6.5.

3.2.3   Polling Options

In this window the user can set the polling interval (in ms).
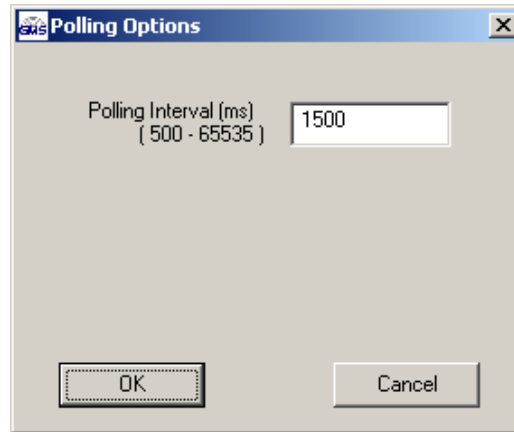
Figure 11 – Polling Options

3.2.4   Administrator Login

Administrator Login allows the user to access more selections by entering password that can be obtained from GMS. The password cannot be changed.

3.2.5   Load Configuration File

This is a special feature that allows the Administrator to change all the parameters of the unit at once. GMS provides Configuration File that can be modified before loading into the unit. Examples of Default Configurations File for VR-s are shown in Table 9 and Table 10.

After desired changes are made in the file, save and close it. Ensure that no any Excel file is open during loading. Click *Load Configuration File* and select file from desired location.

PARAMETER	CONFIGURATIONS															
Config #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Unit Mode	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	DVBT	NB	NB	NB
BDC LO	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550
BDC Side	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High
BDC Gain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COFDM BW	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	2.5Mhz	2.5Mhz	2.5Mhz
RF Frequency	1755	1802	1850	1755	1802	1850	2200	2300	2400	2200	2300	2400	2345	1802	2300	1802
Modulation GI	1/4	1/4	1/4	1/8	1/8	1/8	1/8	1/8	1/8	1/32	1/32	1/32	1/4	1/16	1/16	1/16
OFDM Polarity	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Invert	Invert	Invert
NTSC Format	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC

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Blue Screen on no Video	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MPEG4 deblocking Filter	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
On screen Display	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Auto Spect Detect	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Descrambling	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
LNB Power	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Power up Video Format	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525

Table 9 – Default Configurations File for LS-Band

PARAMETER	CONFIGURATIONS															
Config #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Unit Mode	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	DVB-T	NB	NB	NB
BDC LO	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200
BDC Side	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High
BDC Gain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COFDM BW	8 MHz	8 MHz	8 MHz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	8Mhz	7Mhz	2.5Mhz	2.5Mhz	2.5Mhz
RF Frequency	4400	4700	5000	4400	4700	5000	4400	4700	5000	4400	4700	5000	4400	4700	5000	4400
Modulation GI	1/4	1/4	1/4	1/8	1/8	1/8	1/8	1/8	1/8	1/32	1/32	1/32	1/16	1/16	1/16	1/16
OFDM Polarity	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
NTSC Format	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC	NTSC
Blue Screen on no Video	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MPEG4 deblocking Filter	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
On screen Display	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Auto Spect Detect	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Descrambling	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
LNB Power	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Pwr up Video Format	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525

Table 10 – Default Configurations File for CB-Band

3.2.6 Write License Code/File

This option allows the user to enable features that are optional, e.g. advanced encryption, when new licensing option is purchased, without sending the unit back to factory.

Depending on the version of the unit, the user will need to load Code or File. Contact GMS for details.

3.2.7   Restore Default Configuration

This option should be selected only after new Firmware was loaded into the unit.

3.2.8   Log Off

Clicking *Log Off* will restrict access to User Parameters only.

3.3 Help

3.3.1   FW Version

This menu contains the Firmware Version of the unit, FPGA Version number of the firmware and the Serial number of the unit. See Figure 12.
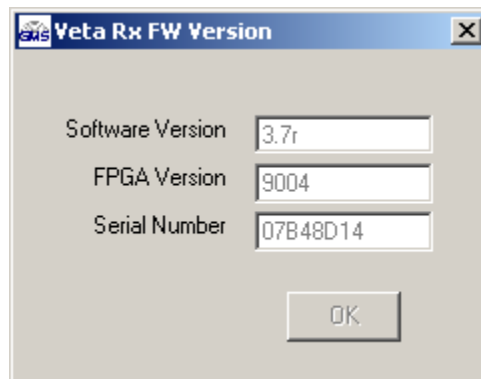

Figure 12 − FW Version Window

3.3.2   About

Choosing this selection displays the *Software* version of the PC control program. See Figure 13.
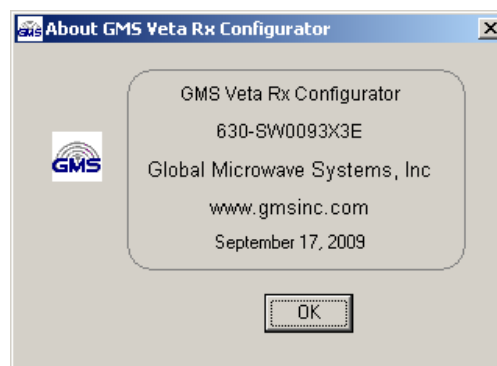
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Figure 13 – About Box Window

4. Control Protocols

The following section describes the control protocol employed on the RS232 link for controlling the VETA transmitters and Receivers.

Refer to corresponding manuals for low level commands list.

4.1 RS232 Control

The physical interface is RS232. Normal operation involves sending a packet from the control device (normally a PC) to the device being controlled. If the packet satisfies an address integrity check, then the controlled device will action the command and send a reply. For compatibility with modems an ASCII style protocol is used. Ports are set for 8 bits, No parity, 1 stop bit.

4.2 Packet Structure

The following Table 11 and Table 12 show the packet structure send and receive.

The Sum check byte is the summation of all bytes in the packet, not including the start and end bytes. Higher order bytes are ignored and the final byte result is modified to prevent ASCII control characters being sent. Bit 7 (highest) is forced high. Status byte will indicate command performed OK, or indicate an error.

ASCII	Meaning
1	All OK
E	General error, Command could not be actioned.

Typically E will be returned if the message is formatted incorrectly (separators in wrong place) or if commands are in upper case, or if commands do not match against the allowed list of commands, or if the checksum is wrong.

Addresses in the range 0001 to 9998 are for general use. Address 0000 is reserved and 9999 is a broadcast address. I.e. any device will reply to this address. Its reply will contain its own specific address.

All data in the transmitter and receiver is stored as one of 5 data types: Double, String, List, Integer or Hex Integer. The data type dictates the contents of the data section of the reply.

- List – 1 byte for sending. Value is hexadecimal coded as ASCII. 2 byte reply. Reply represents index into original choice list. E.g. Reply 02 indicates entry 2 in original list.

- Double - variable length. Reply always contains decimal point and 4 decimal places, can have 1 to 3 digits before decimal.

- Integer - 6byte reply. Integer value with stuffed with preceding zeros. e.g. GOP reply 000012 = GOP length 12

- String - Variable length. Reply is string excluding null terminator

- Hex Integer – 8byte Hex reply

ASCII	Value	
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
R	20h-7Eh	1 byte command type. **r** read, **w** write or **m** misc
I	20h-7E	1 byte indicator of internal data block
ABC	20h-7Eh	Command –three byte mnemonic
;	3Bh	Separator
PQR	20h-7Eh	Data –Optional, variable length
;	3Bh	Separator
X	20h-7Eh	Sum Check
ETX	03h	End byte

Table 11 – Packet Structure Sending (from PC)

ASCII	Value	
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
Z	20h-7Eh	Status Byte
PQR	20h-7E	Data –Optional, variable length
;	20h-7Eh	Separator
X	3Bh	Sum Check
ETX	20h-7Eh	End byte

Table 12 – Packet Structure Reply (from controlled device)

4.3 Command List

Description	R/W	Block	Command	Data Sent	Data Type
Input Frequency	R/W	1	ipf	Frequency received by the antenna. Decimal point allowed	Double
BDC LO	R/W	1	dco	Decimal point allowed	Double
BDC LO Side	R/W	1	los	0=Low 1=High	List

OFDM BW	R/W	1	wid	0=8 MHz 1=7 MHz 2=6 MHz 3=2.5 MHz 4=1.25 MHz	List
OFDM Mode	R	1	mod	NB Mode 0=QPSK 1=16QAM DVBT Mode 0=QPSK 1=16QAM 2=64 QAM	List
OFDM FEC	R	1	fec	NB Mode 1=2/3 2=1/3 DVBT Mode 0=1/2 1=2/3 2=3/4 3=5/6 4=7/8	List
OFDM Guard	NB R/W DVBT R	1	gua	NB Mode 1=1/16 2=1/8 DVBT Mode 0=1/32 1=1/16 2=1/8 3= 1/4	List
OFDM Polarity	R	1	pol	0=Normal 1=Inverted	List
Input SNR A	R	1	snr	Input SNR in dB	Double
Input SNR B	R	1	mer	Input SNR in dB	Double
BER Pre Viterbi	R	1	pre	Pre Viterbi x 10-6	Int
BER Post Viterbi	R	1	pos	Post Viterbi x 10-6	Int
Packet Errors	R	1	pkt	Errors	Int
Lock Status	R	1	loc	0=Locked 1=Not Locked	List
Input Level A	R	1	ina	Input Level in dBm	Double
Input Level B	R	1	inb	Input Level in dBm	Double

Table 13 – Commands for Tuners

Description	R/W	Block	Command	Data Sent	Data Type
Unit Mode	R/W	g	udm	0=Narrow Band 1=DVBT	List
Input Mode	R/W	g	mod	0=RF Input 1=Chaining Input	List
LNB Power	R/W	g	lnb	0=OFF 1=ON	List
RS 232 Address	R/W	g	add	Unit Address 0000-9999	Integer
Software version	R	g	sof	Software Version Number	String
FPGA Version	R	g	fpg	FPGA Version Number	String
Serial Number	R	g	ser	Serial Number Hex	String
License Code	W	g	lco	License number to enable certain features	List
On Screen Display	R/W	g	osd	0=Off 1=Channel A 2=Channel B	List
Auxiliary Address	R/W	g	aux	Unit Address 0000-9999	Integer
AGC Meter Scale	R/W	g	agc	Range 0 - 10.0 Decimal point allowed	Double
Daisy Chain RS232 Control	R/W	g	cdc	0=OFF 1=ON	List
Auto Spectrum Detection (NB)	R/W	g	asd	0=OFF 1=ON	List
Chaining Output Mode 1	R/W	g	cha	0=Demod 1=Chaining In	List
Chaining Output Mode 2	R/W	g	ch2	0=Pre descrambling 1=Post descrambling	List
License Mask	R	g	lma	Bit mask of licensed features	Integer
BDC Gain Offset	R/W	g	dcg	Range -30.0 -+30.0.Decimal point allowed	Double
Board Type	R	g	bty	PCB Type	String
Number of configurations	R/W	g	cfm	0=8 Configurations 1=16 Configurations	List

Description	R/W	Block	Command	Data Sent	Data Type
OSD Type	R/W	g	osp	0=Standard 1=Enhanced	List

Table 14 – 'g' Commands

Description	R/W	Block	Command	Data Sent	Data Type
Unit Number	R/W	e	ser	Index into list of programs	List
Preferred unit Name	R/W	e	def	Preferred unit Name	String
525 Video Format	R/W	e	525	0=NTSC 1=NTSC no Ped	List
Locked	R	e	loc	0=No 1=Yes	List
Line Standard	R	e	lin	0=625 1=525	Integer
Fail mode	R/W	e	fai	0=Freeze 1=Blue	List
Power Up Line Standard	R/W	e	pwr	0=625 1=525	List
Scrambling status	R	e	scr	0=Clear 1=Scrambled	List
MPEG-4 De-blocking Filter	R/W	e	deb	0=Enable 1=Disable	List
Received Video Type	R	e	vid	0=MPEG-2 1=MPEG-4	List
TX Video Input Lock	R	e	txv	0=Unlocked 1=Locked	List
Default Service Name match	R	e	dsm	0=No Match 1=Match	List
Video PID	R	e	vpi	13 bit PID	Integer
Audio PID	R	e	api	13 bit PID	Integer
Data PID	R	e	dpi	13 bit PID	Integer
Video Frame Lock mode	R/W	e	fra	0=Received signal 1=Local/Internal	List

Table 15 – Decoder Configuration Commands

Description	R/W	Block	Command	Data Sent	Data Type
Store current configuration	R/W	d	sto	Config Address (1-16)	Integer
Load Configuration into current	R/W	d	loa	Config Address (1-16)	Integer
Restore default build	R/W	d	def	0=No 1=Yes	List
Read number of last configuration	R	d	las	Config Address	Integer

<p align="center">Table 16 – Memory Configuration Commands</p>

Description	R/W	Block	Command	Data Sent	Data Type
Descrambling	R/W	z	des	0=Off 1=ABS 4=AES128 5=AES128+ 6=AES256 7=AES256+ 8=Bcrypt128 9=Bcrypt128+ 10=Bcrypt256 11=Bcrypt256+	List
ABS Scrambling Key	W	z	ebs	Basic scrambling Key	8 digit hex string
Scrambling Key – lower 128 bits	W	z	aes	AES Scrambling Key – lower 128 bits	32 digit hex string
Scrambling Key – upper 128 bits	W	z	a25	AES Scrambling Key – upper 128 bits	32 digit hex string

<p align="center">Table 17 – Descrambling Commands</p>

Description	R/W	Block	Command	Data Sent	Data Type
Data On/OFF	R/W	t	dat	0=OFF 1=ON	List

Description	R/W	Block	Command	Data Sent	Data Type
Data Baudrate	R	t	bau	2=1200 Baud 3=2400 Baud 4=4800 Baud 5=9600 Baud 6=19200 Baud 7=38400 Baud 8=57600 Baud 9=115200 Baud	Integer
Data parity	R/W	t	par	0=None 1=Even 2=Odd	List

Table 18 – RS232 Data Pipe Commands

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